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| PILLSBURY WINTHROP SHAW PITTMAN, LLP | | | FIORITO, JAMES | |
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1763

DATE MAILED: 11/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/736,991

Applicant(s)

LAFLAMME ET AL.

Examiner

James A. Fiorito

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) See Continuation Sheet is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7, 9, 13, 17, 19, 20, 22, 27, 28, 30, 31, 35-38, 42 and 43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-44 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date Sep 16 2005
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

Continuation of Disposition of Claims: Claims withdrawn from consideration are 4-6,8,10-12,14-16,18,21,23-26,29,32-34,39-41 and 44.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-43, drawn to an apparatus, classified in class 118, subclass 718.
- II. Claims 44, drawn to a method, classified in class 427, subclass 230.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the method can be used to treat storage containers in a chemical process system.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

This application contains claims directed to the following patentably distinct species of the claimed invention:

Species 1 – Embodiment 1, Claims with a protection barrier comprising at least one of Al_2O_3 , Y_2O_3 , Sc_2O_3 , Sc_2F_3 , YF_3 , La_2O_3 , CeO_2 , Eu_2O_3 , and DyO_3 ; and

Species 2 – Claims with a protective barrier comprising an anodized metal impregnated with TFE and/or PTFE.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, Claim 7 is generic to species 1.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Jeffrey D. Karceski on October 28, 2005 a provisional election was made with traverse to prosecute the invention of Invention I Species 1, claims 1-3, 7, 9, 13, 17, 19-20, 22, 27-28, 30-31, 35-38 and 42-43.

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Affirmation of this election must be made by applicant in replying to this Office action.

Claims 4-6, 8, 10-12, 14-16, 18, 21, 23-26, 29, 32-34, 39-41, and 44 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 31, 35-38, and 42-43 are rejected under 35 U.S.C. 102(e) as being anticipated by Carducci (US 2003/0037880 A1).

With respect to Claim 31: Carducci discloses a chemical treatment system for chemically altering exposed surface layer on the substrate comprising: a temperature controlled chemical treatment chamber having a protective barrier formed on at least a portion of an interior surface (Paragraph 80 Lines 1-4); a temperature controlled substrate holder mounted within the chemical treatment chamber (Fig. 1 Item 112); a vacuum pumping system coupled to the chemical treatment chamber (Fig. 1 Item 109), and a gas distribution plate comprising a plurality of gas injection orifices (Fig. 1 Item 350), the gas distribution plate being coupled to a temperature controlled gas

distribution system for introducing a process gas into the chemical treatment chamber (Fig. 1 Item 140).

With respect to Claim 35: Carducci discloses a processing system as claimed in claim 31, wherein the protective barrier on the interior surface of the chemical treatment chamber comprises at least one of Al_2O_3 , Y_2O_3 , Sc_2O_3 , Sc_2F_3 , YF_3 , La_2O_3 , CeO_2 , Eu_2O_3 , and DyO_3 (Paragraph 80 Lines 1-4). Anodized aluminum is composed mostly of Al_2O_3 , see definition of anodizing in the online encyclopedia Wikipedia third paragraph.

With respect to Claim 36: Carducci discloses chemical treatment system of claim 31, wherein the substrate holder has a protective barrier formed on at least a portion of an exposed surface (Paragraph 59 Lines 1-6).

With respect to Claim 37: Carducci discloses a chemical treatment system of claim 31, wherein a protective barrier is formed on at least a portion of an exposed surface of the gas distribution plate and on at least a portion of an exposed surface of each orifice (Paragraph 80 Lines 1-4).

With respect to Claim 38: Carducci discloses a thermal treatment system for thermally treating the chemically altered surface layers on the substrate (Fig. 1 Item 112), the thermal treatment system comprising: a temperature controlled thermal treatment chamber having a protective barrier formed on at least a portion of an interior surface (Fig. 1 Item 121); a temperature controlled substrate holder mounted within the thermal treatment chamber (Fig. 1 Item 124); a vacuum pumping system coupled to the thermal treatment chamber (Fig. 1 Item 109); and a temperature controlled upper assembly coupled to the thermal treatment chamber (Fig. 1 Item 140).

With respect to Claim 42: Carducci discloses a thermal treatment system as claimed in claim 38, wherein the protective barrier on the interior surface of the thermal treatment chamber comprises at least one of Al_2O_3 , Y_2O_3 , Sc_2O_3 , Sc_2F_3 , YF_3 , La_2O_3 , CeO_2 , Eu_2O_3 , and DyO_3 (Paragraph 80 Lines 1-4).

With respect to Claim 43: Carducci discloses a thermal treatment system as claimed in claim 38, wherein the substrate holder has a protective barrier formed on at least one exposed surface (Paragraph 59 Lines 1-6).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 7, 9, 17, 19 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okase (US 6,228,173) in view of Lingampalli (US 6,632,325).

With respect to Claim 1: Okase discloses a reduced maintenance processing system for treating a substrate comprising: a chemical treatment system for chemically altering exposed surface layers (Fig. 1 Item 182) on the substrate comprising a temperature controlled chemical treatment chamber (Fig. 1 Item 162); a thermal treatment system for thermally treating the chemically altered surface layers on the substrate (Fig.2 Item 22), the thermal treatment system comprising a temperature

controlled thermal treatment chamber (Fig. 2 Item 44) having a protective barrier formed on at least a portion of an interior surface (Fig. 2 Item 68, Column 6 Lines 52-54); and a thermal insulation assembly coupled to the thermal treatment system and the chemical treatment system (Fig. 1 Item 3).

Okase does not expressly disclose the chemical treatment and thermal treatment chambers have a protective barrier formed on at least a portion of an interior surface (Column 5 Lines 31-42).

Lingampalli discloses a chemical and thermal treatment chamber with a protective barrier formed on at least a portion of the interior surface. Okase and Lingampalli are analogous art because they are from the same field of endeavor, namely semiconductor processing apparatus.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form Okase's apparatus including a chemical treatment and thermal treatment chamber having a protective barrier formed on at least a portion of an interior surface in view of the teaching of Lingampalli. The suggestion or motivation for doing so would have been to provide a chemical and thermal treatment chamber with internal protective coating (Column 5 Lines 31-42). Therefore, it would have been obvious to combine Okase with Lingampalli for the benefit of a chemical treatment and thermal treatment chamber having a protective barrier formed on at least a portion of an interior surface to obtain the invention specified in Claim 1.

With respect to Claim 7: Lingampalli discloses a processing system, wherein the protective barrier on the interior surface of the chemical treatment chamber comprises

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at least one of Al_2O_3 , Y_2O_3 , Sc_2O_3 , Sc_2F_3 , YF_3 , La_2O_3 , CeO_2 , Eu_2O_3 , and DyO_3 (Column 5 Lines 31-42).

With respect to Claim 9: Okase discloses a processing system as claimed in claim 1, wherein the chemical treatment system further comprises a temperature controlled substrate holder (Fig. 2 Item 44) making a protective barrier formed on at least a portion thereof (Fig. 2 Item 68), the protective barrier on the temperature controlled substrate holder mounted within the chemical treatment chamber comprising at least one of Al_2O_3 , Y_2O_3 , Sc_2O_3 , Sc_2F_3 , YF_3 , La_2O_3 , CeO_2 , Eu_2O_3 , and DyO_3 (Column 6 Lines 51-54).

With respect to Claim 17: Lingampalli discloses a processing system, wherein the protective barrier on the interior surface of temperature controlled thermal treatment chamber comprises at least one of Al_2O_3 , Y_2O_3 , Sc_2O_3 , Sc_2F_3 , YF_3 , La_2O_3 , CeO_2 , Eu_2O_3 , and DyO_3 (Column 5 Lines 31-42).

With respect to Claim 19: Okase discloses a processing system wherein the thermal treatment system further comprises a temperature controlled substrate holder mounted within the thermal treatment chamber (Fig. 2 Item 44) and having a protective barrier formed on at least a portion of an exposed surface (Fig. 2 Item 68), the protective barrier on the exposed surface of the temperature controlled substrate holder mounted within the temperature controlled thermal treatment chamber comprises at least one of Al_2O_3 , Y_2O_3 , Sc_2O_3 , Sc_2F_3 , YF_3 , La_2O_3 , CeO_2 , Eu_2O_3 , and DyO_3 (Column 6 Lines 51-54).

With respect to Claim 27: Okase discloses a processing system, wherein the thermal treatment system further comprises a substrate lifter assembly coupled to the thermal treatment chamber for vertically translating the substrate between a transfer plane and the substrate holder (Fig. 2 Item 62).

Claims 2, 20, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okase (US 6,228,173) in view of Lingampalli (US 6,632,325) as applied to claim 1 above, and further in view of Imafuku (US 2004/0083970 A1).

With respect to Claim 2: Okase in view of Lingampalli discloses a processing system as claimed in Claim 1.

Okase in view of Lingampalli does not expressly state the thermal insulation assembly comprises a protective barrier on at least one exposed surface.

Imafuku teaches the thermal insulation assembly comprises a protective barrier on at least one exposed surface (Paragraph 27, Lines 1-6). Okase, Lingampalli, and Imafuku are analogous art because they are from the same field of endeavor, namely semiconductor processing apparatus.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the apparatus of Okase in view of Lingampalli including a thermal insulation assembly comprises a protective barrier on at least one exposed surface. The suggestion or motivation for doing so would have been to provide a stable condition maintainable even when it is exposed to plasma (Paragraph 27, Lines 6-7). Therefore, it would have been obvious to combine Okase in view of Lingampalli with Imafuku for the

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benefit of having a thermal insulation assembly comprising a protective barrier on at least one exposed surface to obtain the invention specified in Claim 2.

With respect to Claim 20: Imafuku discloses a processing system, wherein the thermal insulation assembly comprises a gate valve assembly, wherein a protective barrier is formed on at least a portion of an exposed surface of the gate valve assembly (Fig. 2 Items 200 and 300).

With respect to Claim 22: Imafuku discloses a processing system, wherein the protective barrier on the exposed surface of the gate valve assembly comprises at least one of Al_2O_3 , Y_2O_3 , Sc_2O_3 , Sc_2F_3 , YF_3 , La_2O_3 , CeO_2 , Eu_2O_3 , and DyO_3 (Paragraph 27 Lines 1-6).

Claims 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okase (US 6,228,173) in view of Lingampalli (US 6,632,325) as applied to claim 1 above, and further in view of Carducci (US 2003/0037880 A1).

With respect to Claim 3: Okase discloses a processing system, wherein the chemical treatment system further comprises a temperature controlled substrate holder mounted within the chemical treatment chamber (Fig. 14 Item 162) and having a protective barrier formed on at least a portion of an exposed surface (Fig. 14 Item 134, Column 12 Lines 59-60), a vacuum pumping system coupled to the chemical treatment chamber (Fig. 14 Item 179), the thermal treatment system further comprises a temperature controlled substrate holder mounted within the thermal treatment chamber (Fig. 2 Item 44) and having a protective barrier formed on at least a portion of an

exposed surface (Fig. 2 Item 68), and a vacuum pumping system coupled to the thermal treatment chamber (Fig. 2 Item 32).

Lingampalli discloses a gas distribution plate comprising a plurality of gas injection orifices and having a protective barrier formed on at least a portion of an exposed surface of the gas distribution plate and at least a portion of an exposed surface of each orifice (Fig. 1 Item 118, Column 5 Lines 38-42).

However, Okase in view of Lingampalli does not expressly state the gas distribution plate is coupled to a temperature controlled gas distribution system for introducing a process gas into the chemical treatment chamber; and the processing system further comprises a control system coupled to the chemical treatment system and the thermal treatment system, and configured to control at least one of a chemical treatment chamber temperature, a chemical treatment gas distribution system temperature, a chemical treatment substrate holder temperature, a chemical treatment substrate temperature, a chemical treatment processing pressure, a chemical treatment gas flow rate, a thermal treatment chamber temperature, a thermal treatment substrate holder temperature, a thermal treatment substrate temperature, a thermal treatment processing pressure, and a thermal treatment gas flow rate.

Carducci teaches the gas distribution plate is coupled to a temperature controlled gas distribution system for introducing a process gas into the chemical treatment chamber (Fig. 1 Item 140); and the processing system further comprises a control system coupled to the chemical treatment system and the thermal treatment system, and configured to control at least one of a chemical treatment chamber temperature, a

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chemical treatment gas distribution system temperature, a chemical treatment substrate holder temperature, a chemical treatment substrate temperature, a chemical treatment processing pressure, a chemical treatment gas flow rate, a thermal treatment chamber temperature, a thermal treatment substrate holder temperature, a thermal treatment substrate temperature, a thermal treatment processing pressure, and a thermal treatment gas flow rate (Fig. 1 Item 140). Okase, Lingampalli and Carducci are analogous art because they are from the same field of endeavor, namely semiconductor processing apparatus.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the apparatus of Okase in view of Lingampalli including the gas distribution plate is coupled to a temperature controlled gas distribution system for introducing a process gas into the chemical treatment chamber; and the processing system further comprises a control system coupled to the chemical treatment system and the thermal treatment system, and configured to control at least one of a chemical treatment chamber temperature, a chemical treatment gas distribution system temperature, a chemical treatment substrate holder temperature, a chemical treatment substrate temperature, a chemical treatment processing pressure, a chemical treatment gas flow rate, a thermal treatment chamber temperature, a thermal treatment substrate holder temperature, a thermal treatment substrate temperature, a thermal treatment processing pressure, and a thermal treatment gas flow rate in view of the teaching of Carducci. Therefore, it would have been obvious to combine Okase in view of Lingampalli with Carducci to obtain the invention specified in Claim 3.

With respect to Claim 13: Carducci teaches a processing system, wherein the chemical treatment system further comprises a gas distribution plate comprising a plurality of gas injection orifices (Fig. 1 Item 350) and having a protective barrier formed on at least a portion of an exposed surface of the gas distribution plate (Paragraph 91 Lines 2-4) and at least a portion of an exposed surface of each orifice (Paragraph 99 Lines 8-12), wherein the gas distribution plate is coupled to a temperature controlled gas distribution system for introducing a process gas into the chemical treatment chamber (Fig. 1 Item 140), the protective barrier on the exposed surface of the gas distribution plate and the protective barrier on the exposed surface of each orifice comprises at least one of Al_2O_3 , Y_2O_3 , Sc_2O_3 , Sc_2F_3 , YF_3 , La_2O_3 , CeO_2 , Eu_2O_3 , and DyO_3 (Paragraph 99 Lines 8-12).

Claims 28, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable Okase (US 6,228,173) in view of Lingampalli (US 6,632,325) as applied to claim 1 above, and further in view of Perlov (US 2002/0170672 A1).

With respect to Claim 28: Okase in view of Lingampalli discloses a processing system as claimed in Claim 27.

Okase in view of Lingampalli does not expressly state the substrate lifter assembly comprises a blade having three or more tabs for receiving the substrate and having a protective barrier formed on at least a portion of an exposed surface, and a drive system for vertically translating the substrate between the substrate holder and a transfer plane.

Perlov teaches the substrate lifter assembly comprises a blade having three or more tabs (Fig. 1 Items 25a-c) for receiving the substrate and having a protective barrier formed on at least a portion of an exposed surface (Paragraph 27 Lines 1-4), and a drive system for vertically translating the substrate between the substrate holder and a transfer plane (Fig 2 Item 24). Okase, Lingampalli and Perlov are analogous art because they are from the same field of endeavor, namely semiconductor processing apparatus.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the apparatus of Okase in view of Lingampalli including the substrate lifter assembly comprises a blade having three or more tabs for receiving the substrate and having a protective barrier formed on at least a portion of an exposed surface, and a drive system for vertically translating the substrate between the substrate holder and a transfer plane in view of the teaching of Perlov. The suggestion or motivation for doing so would have been to provide a lift that does not produce particles or scratch a substrate during contact (Paragraph 27 Lines 1-5). Therefore, it would have been obvious to combine Okase in view of Lingampalli with Perlov to obtain the invention specified in Claim 28.

With respect to Claim 30: Perlov teaches a processing system, wherein the protective barrier on the at least one exposed surface of the blade comprises at least one of Al_2O_3 , Y_2O_3 , Sc_2O_3 , Sc_2F_3 , YF_3 , La_2O_3 , CeO_2 , Eu_2O_3 , and DyO_3 (Paragraph 27 Lines 1-5).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Otsuki (US 2001/0003271 A1) teaches a processing apparatus having members for work-processing the substrate under any of heating, plasma and process gas or a combination of them, in which a film of Al_2O_3 and Y_2O_3 is formed on an inner wall surface of the chamber and on those exposed surface of the members within the chamber and has a high-corrosion resistance and insulating property and, when the process gas is introduced onto a processing surface of a semiconductor wafer and diffused into it, any product is less liable to be deposited on a plasma generation area and on those members held within the chamber.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Fiorito whose telephone number is (571)272-7426. The examiner can normally be reached on Standard.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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